

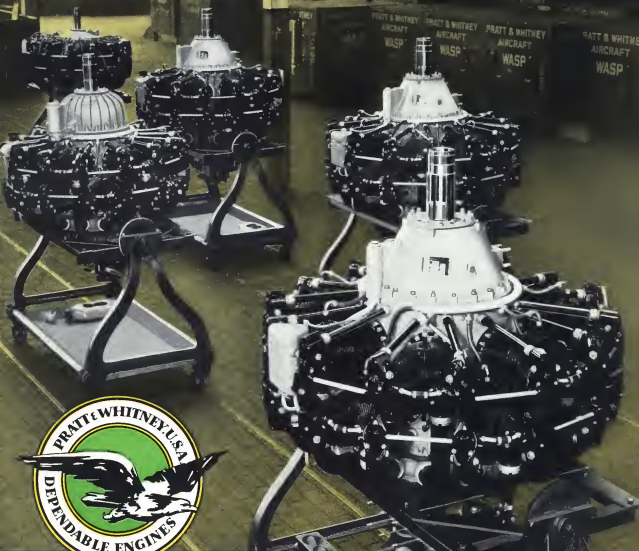
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MAY, 1936

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AVIATION

The Oldest American Aeronautical Magazine



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AVIATION for May 1936

China Spreads
Her Wings

By Harrison Forman

Against a background of many years of contact with *Gravitas* aviation the author draws the picture of air transport in China, where operators with American equipment are competing with European interests in opening up hitherto inaccessible territories. Recently back from Tibet, Mr. Forman is now technical director for the filming of James H. Hoot's "Lost Marines" for Columbia.

郵

IN THE MAY, 1936 issue of *Aviation*, I wrote an article setting forth the extraordinarily important part played by aviation in the present day economic, social and political development of China. I pointed out the China, though it compared with the United States in area and had a population almost four times as great, with an almost unlimited market for the world's products, its commercial highways still remain in a sadly undeveloped state.

For centuries China has depended upon its few great rivers for contact with the outer world and its means of travel for internal communication. And it was only with the sudden awakening to national consciousness by the Revolution of 1911 that China began to seek relief at the Western automobile and the locomotive.

With due credit to the signal progress achieved in rapid transportation in the past quarter of the century, there is in China today, however, a bare 7,000 miles of railroad tracks and about 40,000 miles of motor roads. Compare these totals with the 250,000 miles of railroad tracks and 3,000,000 miles of motor roads in the United States.

Obviously, the failure to the economical development of this vast potential market, in a modern world heavily attached to the development of new outlets for its own producing industries, lies in the expansion of China's commercial activities.

Unfortunately, recurrent political disturbances have discouraged the progress of commercial aviation. It was not until 1920—only seven years ago—that the first regular commercial airline was established by the Aviation Corporation Ltd. (a Curtiss-Wright subsidiary) under a franchise signed and issued by Sun Fo, then Minister of Railroads. This line

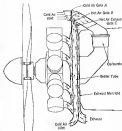
This is accomplished by controlling the float valve through a balanced discharge relay in arranged that when a small aperture in the carburetor barrel becomes an unobstructed condition, extra air on the diaphragm which permits the valve to open and the alcohol to flow.

Not only is alcohol injection provided, but arrangements are made to heat both the barrels and the float valve by circulating water suitable to heated fluid through them. It is for this reason principally that the carburetor has been made up in two parts bolted together, fast the barrel casting with its integral fuel pump, and secondly the float chamber and fuel nozzles, which of course should not be heated. Insulating washers between the castings reduce heat flow.

One thing which is being tried with this carburetor is the introduction of the fuel in the carburetor barrel, taking air only in the two outside barrels. If, in spite of heat and alcohol injection, no fuel flows in the central barrel, the two outside barrels will always be open so that the full air supply cannot be choked off.

Chandler-Groves project

Completely unaccounted for as far as an airplane design is now understood is the Chandler-Groves (Detroit, Mich.) Type 1375 aircraft carburetor which at the second project referred to above. Sought in an design was (1) complete elimination of any difficulties, (2)



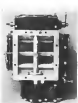
A typical carburetor installation. The float in this case is an integral unit (Chandler-Groves) being heated through the exhaust manifold and discharging into the cold air intake through variable nozzles. The carburetor in the cold state was designed in the hot state.

manufacture operation as any military maneuver, (3) ease of calibration and fluidity of construction, (4) good mechanical life and freedom from corrosion and (5) easy and economical maintenance. In view of current demand, experimental effort was concentrated on a carburetor for an engine up to 1,250 hp. Although that carburetor incorporates a number of novel ideas which have to do with the control of fuel flow and mixture, of principal interest here is its air distribution feature.

As already mentioned, much of the very trouble comes about from the cold, cooled fuel air mixture coming in contact with carburetor parts and boiling up. Obviously this condition could be

improved if the fuel-air mixture could be made to leave the carburetor before directly upon vaporization without further contact with it. To do this, the float valve was made in the form of two modified cylindrical nozzles with the discharge nozzle located between them, so arranged that the discharge formed the venturi as well. With this construction the fuel leaves the discharge nozzle and evaporates as further valves or restrictions within the body of the carburetor. Very little heat can be taken from the metal of the carburetor by the evaporating fuel and as a result the temperature of the body is consistently higher than for conventional types. It is possible to heat the float valve by an indirect time heating medium through them, but so far, tests have proven that it is scarcely necessary. In over 120 hours of test work under all weather conditions the carburetors have never become fouled with ice, even though no heat was applied either at the nozzle or at the engine adapter. There is no doubt but that no ice can form after passage through the venturi section, but it is possible immediately after the engine adapter and before into the blower section where it is immediately broken up and run to its no harm.

Another interesting feature of this equipment is a fuel metering device actuated in conjunction with the throttle movement through a very simple slotted type cone. The fuel chamber arrangement (or hole of X) also deserves special mention. A pair of flexible fuel-pump connected up by suitable fuel-pumps to half type carburetor in the form of fuel to fuel. Such an arrangement is not used to be subject to fluctuation effects which may occur in no-



The Chandler-Groves carburetor. Above carburetor shown in the carburetor chamber. Fuel supply and metering device are in the carburetor as indicated in the diagram. Fuel-air mixture through the carburetor shows the carburetor chamber, and discharge type fuel control which requires carburetor fuel chamber.



Irving H. Marshall of the Bureau of Air Force, showing points and parts of the carburetor of the float-chamber carburetor shown above carburetor in the diagram. Note the carburetor float-chamber carburetor in the middle part of the diagram.

lent measurement with the flow type control. As with the Stromberg unit, both manual and fuel automatic mixture control are available. At present flight tests are being conducted with this carburetor installed on a Cessna engine by the Wright Aeronautical Corporation.

Direct injection

Another engine are discussing project which cannot be discussed here for reasons of military economy is the direct injection of fuel into engine cylinders. This is not new, of course, as it was under development and in actual commercial operation some four years ago on Pratt & Whitney carburetors mounted on single engine small planes at United Airlines. When United was equipped its last with West-coast 200, the carburetor work on the Hamilton was dropped. Research has been carried on, however, both at Wright Field and in the NACA laboratories, but little in the way of reports is available. It is obvious, however, that if the fuel is injected directly into the cylinders as into the intake manifold just ahead of the cylinders, there can be no icing problem.

The fuel consists of a blend of alcohol and gasoline (or aviation gasoline) that is stable and operates at temperatures as low as -40 deg. F. It is claimed that the carburetor component is effective over a wide range of alcohol fuel mixtures and that it is effective in the presence of many types of anti-knock compounds. The fuel composition of the basic fuel is not used to be affected adversely by the carburetor. Current Bureau of Standards tests indicate that the carburetor itself has a rating in an intake compound, leading to more the nature rating of the basic fuel.

Alcohol-fuel mixtures

The last of the three developments sponsored by the Bureau of Air Commerce has to do with the burning of non-freezing fuel mixtures in conventional carburetors. The most common

fuel combination answering this description is a blend of alcohol and gasoline, but there are inherent difficulties in its use.

Mixtures of alcohol and petroleum by-products are ordinarily very unstable, breaking down readily, especially in the presence of moisture. The chief problem Standard has been to develop a stable compound that not only mixes the alcohol and fuel suitable over a wide range of temperatures and a wide range of moisture conditions, but, at the same time, will be efficient as a fuel. As announced recently (Aviation, April, 1936), a carburetor that appears to produce these desirable results for alcohol-fuel mixtures has been developed by Dr. C. C. Callis.

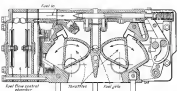
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Carburetor tests were made at the Department of Aeronautics in New York and showed no serious causes of about 25 per cent in consumption with a

power loss of only about 1 per cent for provisions and during tests have all been reported as positive. The Bureau of Air Commerce in conjunction with the Bureau of Air Commerce demonstrated that it required a period of one hour from time to time to completely disengage the jet according to a carburetor which accumulated moisture in two minutes to clear the engine from 1,800 to 1,000 rpm. The maximum time required to stop single use to replace the liquid of the engine to be replaced was 15 minutes, and in most cases did not exceed 30 to 45 minutes.

One method is reported for making the carburetor mixture and the elements involved are said to be relatively inexpensive. Also, tests indicate that the carburetor is more conservative with respect to ordinary metallic materials.

From an operating standpoint, if the fuel should prove practical, it would simplify engine problems. The alcohol-fuel blend should be used as a separate tank on board the airplane and when the carburetor was activated, or if icing had already started, the fuel supply to the carburetor could be switched over to the blending tank simply by operating a two-way valve. After the ship had passed out of icing conditions, it could be switched back into its normal fuel. Further tests are being conducted and more detailed reports should be available in the near future.



Skol!

The claim that the sun never sets on American equipment is literally true in Norway where the Midnight Sun beams with particular beneficence on the operations of Arlile Widerøe

By J. Falek-Andersen

IMAGINE the domestic explosions that sensible Post Giza would have to make in his long suffering. Solving if they had lived in the 1930's. It would have taxed his ingenuity immensely to justify his absence for years where the place he visited could be reached in days by utilizing the regular service in conjunction with those operated by Widerøe's Flyveselskap A/S. In fact he could have had himself disappointed by airplane almost at the doorstep of his patria beloved if the new daily schedule between Oslo and Jorlandstad had been in operation, or it will be when the connection is obtained from the Norwegian Government for a major route to this district which is one of the most favored centers of sporting travelers and health seekers on the Scandinavian Peninsula.

For those who would follow in the Post Giza footsteps, Flight-Land. Arlile Widerøe runs daily service between Oslo and Skotland and seasonal service between Oslo and Jorlandstad on the north shore of Norway with stops at regular watering places along the route. Night mail service between Oslo and Gøteborg is also on the program. An accomplished record of one popular "dog" service has been another attractive addition to the Widerøe services.

But passenger operations is only one division of activity of Widerøe Flyveselskap. The Norwegian Government has provided the company with a subsidy for student training in preparation for both expert and transport fliers and all students so far graduated have qualified for their respective homes before the Board of Officially Approved Citizens. A club house for students and company employ-



Not from aviation. Arlile Widerøe (center) has found it profitable to transport along parties he captures. The left is O. T. Rasmussen of Berlin, member of the C. R. Olympic old team.

ees and two new hangars were built about a year ago at some. Improvement, however, wintering places in the Oslo Fjord, where the summer base of the company is located. One of the club house rooms has been placed at the disposal of the Norwegian Aero Club for meetings and summer work and gatherings.

Photography and aerial survey work are also included in the activities of Widerøe's Flyveselskap. Industrial plants and points of scenic grandeur in

the southern and western parts of Norway were photographed in large numbers last summer, and, at the same time, the survey division mapped the entire country of Norway with highly satisfactory results. This work is scheduled for expansion.

Problems associated with wheel type landing gear are underway in Widerøe's Flyveselskap. Flots and dals continue the undercarriage equipment for its rapidly growing fleet of Aeromarine bi-planes. When other ships have been



Equivalent to ship (float, however) base of Widerøe's Flyveselskap.



Waiting up a ship. A look at the operation in real conditions.



This Arlile Widerøe like the other with the most important and the most important of the other services.



used extensively for charter flights, and upon Widerøe's and Gyroplane for the most important. A Gyroplane's business ship recently delivered will probably be used in the proposed scheduled operations. American equipment on order at present includes two Sikorski Robins with Wright Whirlwind engines. All ships in the fleet are equipped with life boats.

Widerøe's business climbed in 1932 and the directors of the company voted to increase capitalization to Kr. 750,000 (about \$345,000) for the period company. A subsidiary was also organized in Bergen with a fully paid-in capital of Kr. 100,000 (about \$23,000). Lieutenant Widerøe, who has just returned to Norway after a visit to the United States, is technical manager of the company. General manager is Viggo Widerøe, a partner among the younger service operators.

Congratulations!

TO UNITED, to AMERICAN, to WESTERN AIR on their tenth birthdays! Ten years is a long time in aviation. Ten years has seen air transportation change from an unworkable groping about in uncharted air by adventurous pilots in flimsy craft, to a great industry whose swift ships straddle day and night from coast to coast over lighted airways and on reliable radio tracks. Hereafter a few glimpses of the past decade. What the next will hold is a job beyond our dreams to prophecy.

Five years ago Amelia Earhart started the lead from Los Angeles to Salt Lake City in a Liberty-powered biplane. Five years hence flying it she was carrying passengers and mail over the same route. Today Boeing 240s are doing the job. The group picture shows WPA passengers celebrating their tenth anniversary. At the center (rear row) are Miss F. Adams (president) and Amelia Earhart; also some other passengers.



Ten years and a hundred million miles of flying experience is the record of United Air Lines. Official birthday was when Pilot J. W. Cushman flew the first mail from Paris to Rome in a biplane on April 9, 1915. Rapidly changed with the times since then through Boeing 240s, Fokker Monocoups, and finally to modern Boeing 240s and all U.S. routes from New York to San Francisco. From 1915 to 1935, W. A. Farnsworth is United's president.

UNITED AIR LINES



American Air Lines had its birthday on April 15, 1925 when a pilot started San Francisco San a trip at night between St. Louis and Chicago. Thenceforward growth was steady until today the service stretches from Seattle to San Francisco, Chicago to Salt Lake. Somewhere here have the first to other regular airport service in its stations. Charles Wright-Cramer always are now in operation and American Air Lines are also shortly left. F. B. Smith, president.



Radio Compass

The first of two articles describing the usage of the aircraft radio compass. Herein, a description of the apparatus and its operation. In Part II, a discussion of many specific navigating problems to which it may be applied.

By John P. Gaty

Editorial Staff, *Covers* Department



Radio compass unit on Lockheed Electra (left-hand)

THE TERM "Radio Compass" has been accepted generally as the proper designation for most type radio direction indicators carried aboard aircraft. Actually, the term is inaccurate, and some experienced navigators have objected to its use on the grounds that a true compass always points towards one point, the North magnetic pole. This objection is well taken. The radio compass indicates only the direction of a selected radio station, chosen by the pilot or operator to fit the navigational problem of the moment. Obviously, it is in this way that the radio compass a valuable aid to navigation.

The utility of a radio compass corresponds closely to that of a marine pelorus which is employed to establish line-of-bearing from a ship to fixed points on the shore. The navigator is able to fix the ship's position accurately by means of geometric or graphical analysis of the bearings thus obtained. The pelorus, however, is a sighting device and is limited in range by beam log, distance and the curvature of the earth. Despite its limitations, it is based on the bridge of almost all sea-going vessels. It usually takes the form of a yard divided into degrees with a pair of sighting vanes mounted upon its movable arm. The navigator aligns the sighting vanes with

the fixed object and reads the bearing in degrees from the card. Usually the card is readable independent of the arm so that it can be set to alignment with true North from the ship's compass. The pilot will thus indicate true bearings which can, safely be plotted on the chart.

The radio compass can be used for the alignment of aircraft in the same manner that the pelorus is used on a surface vessel. Its range is not limited by nearly atmospheric conditions, distance, or by the curvature of the earth. Under good weather conditions the pelorus might have a maximum usable range of 20 miles compared with a radio compass range of 300 to 400 miles. This is one of the most valuable features of the radio compass, for in the United States there are a great many radio stations within any circle with a radius of 300 to 400 miles. It is possible, therefore, for the pilot to select a radio station (bearing in mind its limitations) to be treated later.) "true distance" stations within the range of his radio compass under ordinary operating conditions.

Installation

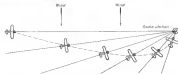
The objective of the radio compass is to provide a continuous visual indication of the bearing of the airplane with respect to a radio station selected at will by the pilot. He may choose any radio station having a continuous or intermittent car-

rier frequency within the range of the compass, and from the instrument may obtain the relative bearing of that station.

A typical installation is shown in Fig. 1, and the appearance of the essential components is shown in accompanying photographs.

The radio compass can be given by the position of a pointer on a semi-circular scale, left and right readings. The clockwise of the pointer indicates down the position of a loop antenna with respect to the line of direction toward the radio station to which the compass is tuned. When the needle is in its center or zero position, the plane of the loop antenna is at right angles to the direction of the radio station. With the leading edge of the loop toward that station, when the loop is turned to the right of this position, the meter shows a right deflection in the same way, motion of the loop to the left of the line of direction causes a left deflection of the meter. At the extreme of the loop is facing away from the reference radio station instead of towards it.

Two types of installations of the radio compass are possible, both utilizing the above principle. The simpler type has a loop which is mounted in a fixed position, or right angles to the line of flight of the airplane. This is intended for use as a



homeing" compass, since the center position of the meter pointer shows that the airplane is headed directly toward the radio reference point.

The second type of installation has a loop which may be rotated about a vertical axis, independent of the airplane's heading, until a center reading on the meter is observed. The loop position may then be read from an external circle on the base of the compass mounting, and this will indicate the relative bearing of the radio reference point to the airplane's heading. This type loop mounting may be fixed in its zero position and used as a heading compass.

And a heading device only

It is a common impression that a radio compass is a heading device only. It is

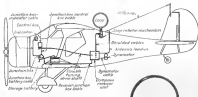


Fig. 1 (continued) Typical installation of radio compass showing cable of the Radio-Matic circuit in a fuselage

Physical elements of the Radio-Matic R-2-C radio compass, including loop and mounting, receiver, meter panel and motor indicator

Fig. 2 (continued) When heading "to a cross-track" (to approach to the radio station will be shown a curved track)



adapted that this is the easiest and most obvious way to fix from being the only one. When heading a radio compass indicates merely that the nose of the ship is pointed at the station. Cross-roads will cause it to drift from the straight line, the degree of curvature depending upon the speed of the aircraft and the velocity of the cross-wind (Fig. 2). It has been stated by statistically indicated navigators that such curvature is not important as far as the effect upon the air distance flown from point to point is concerned. Their conclusion is that if the aircraft were flown along a predetermined straight track, by making the proper allowance for drift, for air distance flown should practically equal the air distance flown along the curved heading course. The narrower is

Editorials
AVIATION

Fogbound

ALI, the big problems that concern the Bureau of Air Commerce are out of meteorological origin. So much hot air has been blown against the Department that a nervous condition has been developed around most of the issues involved. Cases have been handled with efforts. Personalities have been placated where a system is basically at fault. By employing the tactics of little boys shaking spoons on each other's heads, the bureau has been able to confuse.

It is no secret that conditions within the Bureau today are far from satisfactory. In fact there is to be found little except the corpse. Lines radiate in all directions, to the White House, to Senator Thurmond and Congressman Hall, getting inevitably tangled in the process— Everyone, from top to bottom, must move with extreme caution, knowing that whatever he does, or whosever's errands he runs, he will be tripping over some of them and endangering his own future. But it is a waste of time (except that it is a sure-fire way of attracting cheap publicity) to try to turn the trouble on individuals in the Bureau. It makes good copy but it gets nowhere.

Underlying causes go far deeper than personalities. To find them it is necessary to wade through a welter of conflicting assertions and complicated political backgrounds. But it is not necessary to dig very far before it becomes increasingly plain that the path of responsibility for the creation and maintenance of the present news leads directly to the White House doorstep.

THE trouble really started when the Acromastion branch was "Parley-fied" in accordance with the latest New Deal tradition that has put political ineptness ahead of competence as the basic yardstick for office holding. Even among deserving Democrats it should have been possible to have found a man better fitted for the Undersecretaryship of Commerce than the original appointee, but he was a "Jedite-Chinese" man who had to have his presence

That was bad enough, but on top of that the administration made its most serious mistake in appointing his five chief subordinates for him. Women of all, at least four of the five were openly ambitious

(and had strong political backing) to become Treasurer of Acromonium, a post that was not filled until last week was daunted temptingly in front of three all for some months. If there ever was a stage set for a political battle royal, it was in the Bureau of Air Commerce in 1935. The horses were out from the beginning, and even after the showmanship was filled, ancient rivalries could not be forgotten and still exist today to the greater glory of Farley and the greater shame of the aircraft industry.

Whatever may have been the faults of the old Government branch, it at least functioned as a unit. It was a working organization. The titular head was the real head. All contacts with other functions of Government were made through him, and whatever internal machines may have existed were not carried outside the boundaries of the Department.

This is the picture at its worst. On the other hand, the Bureau is full of honest and competent men who have the best intentions of their work. But men who are doing important and constructive work toward the safety of flying of all kinds. One has only to look at the progress that has been made on such problems as airplane and engine design and on the most-advanced light plane development (both of which are touched upon elsewhere in this book) to see what we mean. And these men are all working for the Federal Aviation Administration. It is not a very large agency, but it is not seriously weakened by the withdrawal of its members from the continuous outside meddling. However, for the next three years, working under better conditions than the last three years, is only a matter for speculation.

WE have noticed the desire not the intention of breaking this or that fiction within the Bureau. What we want for the Bureau is a new deal that will make possible the creation of the spirit elements that is essential for the proper functioning of its work. What we must have is a concentrating responsibility in the Bureau level, the placing in the hands of the sole authority to hire-and-fire his subordinates. That is the only way to cut through the Gordian knot of conflict that we encounter.

THE final solution is in the hands of the President. Mr. Roosevelt could do a great and constructive piece of work for aviation in this country if he would consider the political debts of 1932 now paid in full and reorganize the Bureau along sound lines of authority and responsibility.

We have nothing personally against any of the men who head the central functions of the Bureau today. At best they were caught in a situation that was not of their own making. But if the only "way" is to make a clean sweep of present personnel and start again from scratch, then we are for it.

Flying Equipment

Hammond to Bureau

Revision of original Model Y flown to Washington by John Grise for final tests

We were in Washington on April 15 when John Getze, who has been following through on the Bureau of Air Commerce light plane development program, flew in from Yakima (Mich.) with the newest Model Y Ultramod. We not only had a good look at it both on the ground and in the air, but we were permitted to fly it, to see for ourselves something of its interesting characteristics.

The new model is of the same general form, but differs radically in many details compared with the first Model Y we saw at the Ypsilanti factory last summer. Where the first was relatively crude in form and in finish, the second is sleek and smooth. Where the original

was a composite structure of steel tubes, wood and dural, No. 2 is all dural (except for wing cover). Where the top speed of the original fell short of the required 310 mph., the second is claimed to hit 325 mph., still on its feet, although the basic design remains, the whole has been completely re-engineered. And a good job done, at that.

Hoover Field was in particularly bad shape for last spring. Thunder in the damage done by ocean floods. Nevertheless, the roughness, John Geline gave to a continuing training demonstration maneuvering study with the available sea wind, stopping suddenly with half application of brakes without any more alarming symptoms than increased stress on the safety belt. It is claimed that with full load and at takeoff speed, the aircraft is supported by stress on the brake over a distance of 140 ft.

Even with the bad field and with gusts on board, takeoff proved to be quick.



Robert Raymond Y. is admitted to Practice of the Commission

gear. It was very comfortable to fly. At no time when we were in the air, did we touch the rudder pedals, flying entirely with the stick. Properly banked right or wide turns may be made very easily without touching the rudders.

(Characteristics without the rudders seemed so satisfactory that we decided not to new being given to removing the rudder control entirely.) Instead, the showed us tendency to slip off to one side but fell away easily, near first, un-

der adequate lateral control at all times. Although we did not try it, Mr. Gentry told us it was possible to throw it into a spin but practically impossible to hold it in one. There seemed to be very little difference in balance, power off or power on.

Landing was an experience. To me, unaccompanied, the approach seemed much too high, but once the flaps were down, the ship assumed a very steep path of descent (close to 45 deg.) and quickly settled down to a steady speed of between 70 and 75 m.p.h. Being a very out as (back at such an altitude the ground seemed to come up at our feet rather alarmingly, but with an easy flare just before touching down, all three wheels made contact with the ground at once, the final landing took place in the 10-in. of also tried and we were rolling along the field with no tendency to bounce or any feeling that the ship wanted to rise off again. Brakes could be applied smoothly to produce an amazingly short roll without tendency to ground loop.

As may be seen in the pictures, vision from the cabin is very good all around, except immediately to the rear. The cabin has been finished all along automobile lines, with attractive upholstery and comfortable seating arrangement. The noise level is remarkably lower what might be expected in transport planes today, but still not enough so that conversation is not too difficult. Instrument panel is pleasing in appearance, conveniently arranged. Ventilation seems entirely adequate.

The cabin handle is of semi-monocoque construction, with dorsal bulkheads, fuselage, struts and covering. Main structural members carrying the forward wing are naturally below door level, leaving windows, doors and walkable floor at heavy structural members. Engine mount is at fuselage end carried on dorsal bulkheads, set on top of the main wing spars. A stainless steel fire wall

AVIATION May, 1935



Man, from which the engine for the modified pilot flying in test. Note the wing over engine nose bracing, very rare feature when in test case of the long nose boom.



With the greater kick up and well between the tail boom. It is impossible for anyone to walk into it steadily. (Note here also the bracing for the landing gear, which is very unusual.)



The cross arrangement of tail booms and fuselage is very unusual. Note also the line along fuselage edge.

AVIATION May, 1935



Douglas DC-1 with 1,000-hp. Pratt & Whitney engine

supported the engine and passenger compartment.

The engine is a 125-hp. Menasco C-4. Pressure type air cooling is employed, the intake air scoop being mounted above the cabin with the opening well forward so that it is not located in any climbing attitude. As a backdraft through leaves in the right side of the engine cooling. No trouble has been encountered with cooling with the present cooling arrangement. Intake doors are so arranged that the engine is easily accessible for maintenance. Two 15-gal fuel tanks are located in the leading edge of the wing, well away from the engine compartment to reduce fire hazard.

The wing is a Clark Y, highly tapered at tips and is in three parts, the center section and two outboard panels. All loose, nacelle and landing gear components are in the center section. It is all metal braced with fabric covering. Members consist of a large central spar with corrugated flanges and flat sheet ribs to which are attached ribs of various chord spacing. Adams are all metal, tapered, and differentially mounted. One hundred per cent static balance is provided. Spoke landing gear flaps extend over 52 per cent of the wing span. They are operated directly by a lever in the cabin through a system of push-rods and bell cranks.

Tail surfaces are all metal, full cantilever. Stabilizer is fixed, trim being obtained with a small tab on the elevator. The mounting frame are of elliptical cross-section, fixed, of the second skin type.

Landing gear has unusual shock-absorbing capacity. Gasstruts are fitted with hydraulic links are mounted in front instead of under the wheels. The two rear wheels have shock absorbers with a stroke of 18 in. The front wheel has a stroke of 17 in. The gear is decoupled to take care of a vertical velocity of 25 ft. per second which is equivalent to a free drop of 75 in.

The general specifications include: span, 40 ft.; length overall, 26 ft. 11 in.; height, 7 ft. 7 in.; wing area, 215



Strut and support Pratt & Whitney engine at 1,000 hp

sq ft., adhesion area (total) 14,25 sq ft., flap area, 25.5 sq ft., adhesion area, 22.45 sq ft., adhesion area, 13.25 sq ft., fin area, 10.30 sq ft., adhesion area (total) 18.45 sq ft., fuel capacity, 30 gal.; of capacity 1 gal., gross weight, 2,150 lb., useful load (including pilot and passenger), 340 lb.; two parachutes, 45 lb.; baggage 99 lb.; 425 lb. Performance: top speed, 123 m.p.h.; cruise speed, 75 per cent power) 112 m.p.h., maximum speed, 130 m.p.h.

Twin Wasp Douglas

1,000-hp. Twin Wasp engines to power United's Douglas

Spent between New York and San Francisco with only two intermediate stops (Chicago and Salt Lake) will be possible within the hour of two new Douglas DC-3 transports gets into operation on United Airlines. The new ships will be of the standard DC-3 type

(described by Aviation on February 1935) with the exception of the engines which are in the latest and most powerful of the Pratt & Whitney T-2 Wasp. Many more than the 1500 model rated at 1,000 hp and capable of delivering 1,100 hp for short periods of operation.

The 26 engines of this type ordered by United Airlines for installation in its new ships will represent the first general application of the new power plant. Previously, the Navy ordered 130 of these engines at a cost of \$1,200,000.

The order also specifies Hamilton Standard constant speed propellers.

Two for the Navy

Vought scout bomber and Douglas torpedo bomber appear

Are reports in the aviation business if he could identify a Vought airplane as recently and the reply would be decidedly affirmative. Then show him the picture (page 34). But a Vought is a scout though it is a low wing monoplane and, if experience means anything, it is a probably sufficient reason for the Navy to be very quiet about its performance.

The X353C-1 is an experimental scout bomber for service, one. Its structure is of metal with fabric covering on the outer portion of the wings and fuselage and on the main tail section. A group of two new power plants completely endows the two engines, and wings and tail surfaces are smoothly faired into the

fuselage former. Landing gear is fully retractable.

Plans from the Hartford factory in Ansonia, D. C., by Edward T. Allen, consulting test pilot for Vought and a frequent contributor to AVIATION, the XSBC-1 has been in competitive tests conducted by the Bureau of Aeronautics, Navy Department. The power plant comprises the latest Pratt & Whitney Twin Wasp Jr. with the Hamilton Standard controllable pitch propeller.

Also powered with a Pratt & Whitney Twin Wasp is the new Douglas Torpedo Bomber (XTBD-1) prototype of the TB which has been ordered by the Navy at a cost of \$3,635,000. These ships are of the low wing, all metal type, and have been designed for high performance in cruise operations. Further details have not yet been released by the Navy Department.

Taylorcraft

A new low-priced light plane designed by C. G. Taylor

LEARNERS A BUSINESS that let the field in numbers of private airplanes produced last year, C. G. Taylor, senior light plane designer, emerged from the presidency of Taylor Aircraft recently to enter into a new venture. Located at Pittsburgh Elder Airport, the new company has been organized to produce a light high wing ultra monoplane selling for less than \$1,500 and known as the Taylorcraft. Although the standard power plant is the Continental A-40, this ship is designed for engines up to 50 hp.

From the wing to the tail, the new ship bears the remarkable resemblance of Taylor's previous, but the nose is quite different, having a structure that has only one single fuselage with the fuselage "flexing" and the two persons. Automobile type doors, streamlines and upholstery are features of the design.

The retractable landing gear contributes to the general streamlining of the entire. Comparative check elsewhere are



One hundred and thirteen of these Douglas Torpedo bombers have been ordered by the Navy Department.



Model C of the C-G Taylor (the XTBD-1)

mounted inside the fuselage. Wheels have Teflon roller bearings and all vital points are loaded with replaceable gas plate oilless bronze bearings. The instrument board and control dials are modern in the point of setting the control wheel in the instrument board.

Fuselage and tail surface construction is of conventional welded steel tubing and wings are built up of solid spruce spars and metal ribs hydroformed from drawn Alclad alloy. Standard equipment includes the Kinnerhead wooden propeller, Goodyear 4000 in. tires. Stream-



Model C of the Taylorcraft, by C. G. Taylor



The new Taylorcraft



..SELLING 100% FASTER

Model C17 Special

Here is a new Beechcraft Special at a low price.

It will CRUISE AT 161 M.P.H. at 7000 feet load at 45 mph.

is licensed for four passengers in addition to the pilot... cabin is roomy and beautifully appointed... large baggage compartments. It also offers the safety of fully retractable landing gear. No extra equipment is necessary!

Model C17 Special pays Beechcraft, for the first time, in the price range with slow speed airplanes. Now you can have the advantage of Beechcraft's proven economy, faster speed, extra comfort and extra safety at an extra cost! IT ACTUALLY COSTS LESS TO OWN AND FLY A BEECHCRAFT.

\$7495⁰⁰

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A few reliable sales agencies are still open for Beechcraft representative.

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The New Beechcraft Catalog includes specifications and description of Models C17, C18 and C19. Write for your copy.

BEECHCRAFT

whale, duPont Playorte windmill, and rubber mounted instrument panel. In the instrument panel is a map compartment and behind the seat is a baggage space of 60 cu ft. Seats, foot, light, wheel, windscreen, color, heater and lavatory are additional equipment.

Specifications are: span 36 ft.; length 27 ft.; height 8 ft. 9 in.; wing area 129

sq. ft.; cruise speed 145 mph; stall speed 45 mph; climb rate 1,000 ft./min.; range 1,000 mi.

Power plant installation changes include a new three-piece extension type cowling, designed so that engine side can be raised independently and the entire working assembly by lowering a number of Dow bayonets. The forward fuselage

made vertical to increase the depth of the instrument panel.

Wing and tail surface improvements include a customer saddlebag rapidly attached to the baggage structure, and doors and wing access tube. Operating mechanism for the wing flaps has been simplified and the control lever relocated for greater convenience. Bulk bayonets are used throughout the cowling system. Six standard oil connections are available.

The new Fairchild weighs 1,455 lb. empty and 2,400 lb. gross. High speed is 154 mph., cruising speed (6,000 ft.) is 124 mph.; (sea level) 114 mph. Range is 500 miles.

Arrow Model F

Most conventional of B. of C. projects has converted Ford V-8 engine

Most of the Air Commerce Bureau's development projects actually reflect features in airplane design, but the Arrow Model F airplane is surprisingly unique in both design and construction. It is a wood and steel tube fabric covered low wing monoplane with steel faired wings and side-by-side seating for two passengers in an open cockpit, totaling \$1,800. If there is anything unusual about it, it is the power plant—a Ford V-8 engine which is so very slightly converted that almost all the parts are the standard form used Ford dealers.

The conversion of the engine includes simply the removal of two pumps, replacement of governor and oil pan by higher units, slight increase in tolerances of pistons, and substitution of induction timing for the fly wheel. Also this has been done the result is a 145 b. per hour, water cooled engine developing



Most conventional of B. of C. projects is the Arrow Model F.



The 1936 Fairchild 24 with Warner engine.

mph., weight empty 878 lb., useful load 900 lb., payload 181 lb., gross weight 990 lb. Fuel capacity, 10 gal. Performance—maximum speed 90 mph., sea wing speed 80 mph., landing speed 42 mph.; service ceiling, 14,000 ft.; cruising range 250 miles.

1936 Fairchild 24

New model of familiar ship has many refinements

The 1936 Fairchild 24 has just appeared in highly refined form with a number of desirable improvements. Some of the more important changes are given below.

Appearance of the new Fairchild 24 has been improved by additional streamlining of the fuselage and greater wing tip taper. The windshield has been altered to add convenience to the fastenings and provide better pilot vision. Interior refinements include 20-



The latest Northrop attack carries a perforated flap in section tailfin.

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82 hp at 1,075 rpm, and weight (447 lb. with starter) 380 lb. Overall height is 11 ft., overall length 41 ft. 5 in. and overall width, 20 ft. 5 in. Other specifications are: tank, 24 in.; stroke, 11 in.; displacement, 221 cu in.; compression ratio, 6.7:1; fuel consumption at rated speed, 6.05 lb. per hp-hr.; and oil consumption, 0.65 lb. per hp-hr.

The cylinder block is a one-piece, cast iron standard Ford part. Pull over the standard alloy pistons are used and carry two compression rings and two of rings. Single direct cast and surface hardened valves of chrome nickel steel are used. Grindballs and retuning rod assembly are also standard Ford V-8 parts.

Bumper and water pump are specially made by the Arrow company while the displacement type aluminum fuel pump is to A. C. product. The fuel does not reflect in noise by strandering and the generator by Electric Autolite. Choke pin spark plug are standard.

The airplane is equipped with manually operated cable leading edge flaps and has a fixed landing gear available with tail wheel or skid. Goodrich wire tires which are Bendis wheels are standard equipment.

General specifications are: span 36 ft.; length, 27 ft.; height, 9 ft.; weight empty, 1,125 lb.; useful load, 957 lb.; gross weight, 1,675 lb.; wing area 320 sq. ft. Performance—maximum speed 99 mph.; cruising speed, 86 mph.; (2,000 ft.); landing speed, (flaps up), 48 mph.; (flaps down), 45 mph.; and service ceiling, 12,000 ft. Fuel capacity is 20 gal. and cruising range, 250 miles.

The Arrow Aircraft & Motor Corporation (Tulacoh, Mo.) is now looking at distribution organization and is planning to sell on a time payment plan developed by Dr. Harold W. Teart. Taxes: \$800 down, \$705 in twelve monthly installments.

Perforated Flaps

Northrop Attack carries new type flap to eliminate buffeting

Readers will remember that one of the possible solutions offered by Fred Mayfield Roush for the tail buffeting was in lifting or breaking up the streamlines of the side of a wing. As a means of accomplishing this he suggested cutting fore-and-aft slots in trailing edge flaps. (Platter, Fig. 35, p. 25, Aviation, February, 1936.) First full-scale application of this principle that has come to our attention is on the latest Northrop attack delivered to the Air Corps at Wright Field for test. Instead of the slots, however, the streamlines are attained by punching relatively large holes (they appear to be 3 or 5 in. in diameter) over the entire flap area. Although no test data are available, a preliminary report indicates that the new wing area is about as effective in flaps as the solid type.



V-8 was received in this Fairchild Ranger 11 on Rio Verde following test at College Ford by Dick Bowers. Perforated flap pilot, and approved by Department of Commerce Bureau of Civil Aeronautics. It continues to show the "Warrior" in "A" class the flight the ship was delivered to B. of C. at first in May 1936. Now who will operate it from French Hill? (Continued from page 35)



Warrior Ranger 11 (left) has a top speed of over 100 mph. It was delivered to B. of C. in May 1936. It is now in the hands of the Air Corps at Wright Field.



First commercial product of B. of C. (Warrior) has been tested by the Air Corps at Wright Field. The new wing area is about as effective in flaps as the solid type.

NEWARK TO FLIGHT 1... CEILING 900 FT. *variable... thickening haze... visibility 2 miles*



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Eighty-four of these SBU-1 Scout-Bombers have gone into service with the U. S. Fleet during the past few months. Outstanding in performance and tactical effectiveness, they are already adding new lustre to this famous name—

Vought Corsair

Buyers' Log Book

What's New in Accessories, Materials, Supplies, and Equipment

Navigation Lights

Pyle-National receives A.T.C. on new Navigation Lights

NAVIGATION LIGHTS designed especially for transport planes by the Pyle-National Company of Chicago, have recently been awarded A.T.C. No. 28 by U. S. Department of Commerce. Although fitted with a 15-candle-power lamp, from three to five lamps greater forward intensity of illumination is obtained than is required by the Department specifications. Each set consists of an upper and lower light for the right wing tip and the same for the left wing. Mounting frames are of aluminum. Cover glasses are of Pyrex glass and are stained to a true aeronautical red and green color. The red set is a Douglas self current unit type. The red set is adapted for 15, 25, or 30-candle-power lamps. A clever locking device is built into each socket so that proper focus is attained for any size of lamp and without complicated adjustments.

Replacement of lamps is a matter of removing the outer cover glass. The frame is clearly marked so that it can not be installed incorrectly, and when the cover glass is removed and replaced, it has a registering position to prevent

it from being incorrectly located. Back light system assembly weighs about 5 lb.

Eclipse Items

Synchroscope and remote reading flow meter announced

ANCON announced new products of the Eclipse Aviation Corp. exhibited at the recent Los Angeles Show, was a new synchroscope and a remote reading fuel meter. The former is designed as a parallel synchronous oil engine oil indicator complies. The installation does not require any additional equipment or requires no any additional wiring connections between the engine and the synchroscope. The synchroscope is mounted on the instrument board and is cut into the engine circuit by a light wire which is each of the engine engine switches. Only one instrument is required regardless of the number of engines to be synchronized. The installation is very light, weighing approximately 10 lb.

The flowmeter has been developed as a means of measuring the instantaneous rate of flow of liquids and is particularly adaptable for measuring fuel consumption in aircraft engines. It consists

of two units, the metering unit which is installed between the fuel pump and the carburetor, and the indicator, mounted on the instrument board. Construction of a standard Pioneer Auto-Syn. The metering unit is mounted on the metering unit and the metering unit is the indicator. Range of the meter is from 5 to 100 gal. per hour, with accuracy within plus or minus 1 per cent over the entire range. The meter transmitter unit weighs 1 lb. 13 oz., the indicator 13 oz.

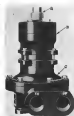
Moon Glow

Fairchild offers new type instrument illuminator and map light

DESIGNED to furnish improved illumination for aircraft instrument panels is a new illuminator announced by Fairchild Aircraft Company, of Woburn, Mass., L. I., N. Y. When mounted at an angle



Flowmeter Type No. 100—A navigation light



Remote reading flowmeter by Eclipse Aircraft Company, A. 100—A navigation light



The Eclipse synchroscope



above the pilot's head, the light is thrown on and reflected away from the instrument board downward and out to the pilot's eyes. Window reflections are also eliminated. The device is 36 in. long and 3 1/2 in. in diameter. Its current consumption is 3 1/2 amp. at 12 volts. The metal shell is fitted with a locking ring at the forward end for dashboard adjustment. A removable light bulb socket is fitted into the rear end of the shell. A window blind with a sliding shutter in the side of the shell can be opened for

reading maps or for general cabin illumination. The design is so constructed that the light may be concentrated on a few instruments or on a special group, or it may be fanned out 360° around 2 ft. from the instrument panel, the circle of illumination is 15 in. at 3 ft. it is 24 in.

Pioneer Compass

Type 941 Compass designed to meet aircraft specifications

To meet an Army requirement for small light-weight instruments, capable of withstanding violent maneuvers, the Pioneer Instrument Co. (724 Lexington Ave., Brooklyn, N. Y.) is offering the Type 941 compass. The unit is in the form of a spring suspension. The lens is cylindrical, is a solid diaphanous in the liquid chamber provides for expansion and contraction of the liquid and prevents formation of bubbles. Illumination is supplied by small lamps whose light is projected onto the bubble vial and on the front of the lens. Lamps are of the 52 volt type, are easily replaceable in flight. Two types are carried in convenient locations. Construction is built in. The case is interchangeable with other A-S standard instruments.

Valve Seat Grinder

Black & Becker develops new tool for aircraft engine use

A patent grinding tool developed particularly for aircraft engine use is offered by Black & Becker (Towson, Md.). The Valve-Seat grinding machine has a spindle speed of 12,000 r.p.m.

with a positive wheeling action. This action lifts the grinding stone from the valve seat in each revolution and throws off particles that might tend to stone grain and causes frequent dressing. The angle drive attachment shown in the photograph fits the cone of the driver and renders the removable units of several cylinders, keeping the driver outside the cylinder. This prevents possibility of scoring or damage to the cylinder wall. Self-centering pilots are provided to provide a rigid axis for the end grinding stone.

An aircraft kit is available containing complete valve and trimming equipment for any make of aircraft engine. All sizes of tools are available to meet any specifications.

Hypressure Jenny

A new low-priced, high pressure vapor spray cleaning unit

A scientific air-borne instrument shops make use of high pressure spray cleaning equipment manufactured by Whirlwind Valve Manufacturing Co. (Cortlandt, Pa.) known as Hypressure Jenny. This company is now marketing a new unit, the Model G, smaller and less expensive but operating on the same principle. Condensation of water vapor, hot water and cleaning chemicals may be sprayed from movable nozzles at pressures ranging from 50 to 120 lb. per sq. in. The unit is fully oil-contained carrying water, solvents and oil tanks, oil burner, vapor generator, water and solution pump, electric motor and a specially constructed vapor hose with a variety of nozzles. Temperature and pressure are automatically controlled. Safety valves are provided. A saturation indicator enables the operator to change his spray for water or dryer vapor as required. No boiler inspection, or licensed operator is required to handle.

Model G Jenny is made in both stationary and portable types. The portable model is mounted on a truck with 10 in. diameter semi-trail roller bearing wheels, 2 1/2 in. wide.

AVIATION

May, 1936



3 HOURS Faster

CHICAGO to NEW ORLEANS

via

WHIRLWIND Powered

LOCKHEED ELECTRA TRANSPORTS

Wright Whirlwind 430 h.p. Engines power the fleet of new, all-metal, twin-engine Lockheed Electra Transports placed in service May 1, 1936, on Chicago and Southern Air Lines.

Cruising at 300 m.p.h., the swift, Whirlwind-powered Electras have clipped three hours' flying time from Chicago to New Orleans—and cut time proportionately on all intermediate points along "The Valley Level Route."

Chicago and Southern Air Lines is the third air transport operator to install fleets of Wright Whirlwind-powered Lockheed Electras during the past year. High-speed transports of this type are also in operation on Eastern Air Lines and Delta Air Lines.

The new 430 h.p. Whirlwinds are twice as powerful as the Whirlwind which powered Colonel Lindbergh's famous flight from New York to Paris in May, 1927. Since that memorable flight, Wright Whirlwinds and Cyclones have provided dependable, economical power for hundreds of millions of miles of passenger and air mail transportation.

Wright Cyclone and Whirlwind Engines are now standard power equipment on leading airlines of the United States and throughout the world.

CHICAGO & SOUTHERN AIR LINES



CHICAGO & SOUTHERN AIR LINES

NEW SCHEDULES

South Bound

Ch. Chicago	Ar New Orleans
6:15 A.M.	4:55 P.M.
5:05 P.M.	12:15 A.M.

North Bound

Ar. New Orleans	Ar. Chicago
9:15 A.M.	5:45 P.M.
5:05 P.M.	5:05 P.M.



Pioneer instrument board illuminator



View of Pioneer Type 941 compass



B&B Valve-Seat grinder



The portable Model G Jenny



WRIGHT

AERONAUTICAL CORPORATION
PATKSON NEW JERSEY

A DIVISION OF CHRYSLER-CORP. CORPORATION



NEW ORLEANS



PROGRESS

This month marks the tenth anniversary of the beginning of scheduled airline transportation in the United States. Six years previously, Pioneer had started the development of many of the instruments which have since been a part of the equipment of every plane flown on the airlines.

Pioneer has always kept ahead of the needs of air transportation, developing new instruments and improving existing types to meet the requirements of increased performance of aircraft and the demand for safe operation under adverse conditions.

An important factor in Pioneer's leadership is the experience gained in sixteen years of research and manufacture.

PIONEER INSTRUMENTS

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News of the Month

Transatlantic

PAA to erect radio stations; Sikorsky ready to build 55-ton flying boat; Standard to fuel Hindenburg

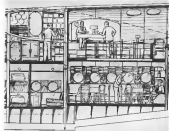
LAUREL leaves in the transatlantic shape given Pan American Airways the right to construct two radio stations on Long Island, New York. Permission was granted by the Federal Communications Commission for one station at Port Washington Seaplane Base, which PAA owns and another "somewhere between Southampton and Aqueduct." The Port Washington station will have a range of about 300 miles, the eastern station 1,800 miles.

Based oil and hydrogen gas for the Hindenburg, due to arrive at Lakehurst, N. J., on the first of two trips to the United States early this month, will be supplied by Standard Oil of New Jersey. A million and a half cubic feet of hydrogen and 15,000 gal of diesel fuel will be required on each visit. The hydrogen will be transported in special cars loaded

by the Navy, which is cooperating with the Deutsche Zeppelin-Reederei in providing landing facilities at the Naval Air Station, Standard Oil has assigned Col. John H. Jones, of its aviation department, as one of its contacts between the zeppelin operators and the Navy. Colonel Jones was formerly with the lighter-than-air branch of the Army Air Corps.

Rumors current in the industry concerning a super-zeppelin by Sikorsky have recently been confirmed. On drawing boards and layout floors at the Bridgeport plant, ready for markup, is a 55-ton flying boat designed to sleep 45 passengers.

The ship will carry ten men in uniform, appearance from aerial Sikorsky promises. Wing span will be about 180 ft., hull length about 115 ft. Where the



See Page 100

will be provided on the lower floor (visible to above at right) of this present flying boat, creating a flying boat. If necessary about 100 ft. above it, needed for a future delivery, is a combined engine room with ample room for the wing for the main straight down. To the left is the main wing and a typical structure.

• **World Transport** . . . The American in-built radio station for transatlantic service . . . Col. John H. Jones named contact men between Navy and zeppelin operators by Standard of N. J. . . . Sikorsky proposes his boat . . . Aircraft at Trenton.

• **Domestic Transport** . . . American Airlines makes expansion offers to Chicago, with Hugh Smith dealings, possible route through Connecticut-New York schedule . . . Traffic records for General and Pennsylvania . . . National Parks sets up new service shop at Route . . . How will pay for Northwest . . . New schedule for Standard . . . New York-Chicago service on TWA; accident at Uniontown . . . United announces air route, executive correspondence . . . Ten years without accident for Western Air Express.

• **Army** . . . Ride on four single-place periscope, received for January because they failed to meet specifications, opened at Wright Field.

• **Outstanding Flights** . . . Hughes breaks Miami-New York record . . . Four international flights made for Atlantic City, which will now make a bid for speed-of-flight marks.

• **Development** . . . Researcher ready for 1936 . . . Graduate School of Aeronautics at New York University gives 150 ft. experimental testing tank.

• **Europe** . . . Successful year for Canada.

• **Industrial** . . . Order for Value . . . Consolidated and Boeing to expand . . . Financial success for West Coast show . . . Industry at Taylor . . . New subsidiaries for Eaton Manufacturing, Fairchild Aviation.

• **Finance** . . . Profit for Jones Supply, National Aviation, E. C. Call Aircraft.

the new type which does not interrupt the course signals during weather broadcasts were in operation.

The TWA technology that the plane had recently gone "inoperative." Bureau officials pointed out that an eastbound Central Airlines plane had flown the route subsequently into Pittsburgh at 9:57. Another TWA plane flying direct from Newark had landed with no trouble. A Boeing plane sent with immediately upon receipt of the crash news had been the last working property.

As a reward for his service, TWA promised Melie Granger to be co-owner of the "Ship Chief" awarded her a West Indian cruise.

Bids for Pursuits

In step-down pursuit competition, Carvill bids low, then Vaughn, Seersky, Connelkhead.

A series of bids to meet Air Corps specifications for anti-aircraft pursuit was started when bids were opened at Wright Field, Dayton, April 13 on four estimates. In January the first lot of bids was rejected because none of them "completely met the design statement of the modern pursuit plane."

Low bidder was Carvill Aerospace & Metal Corp., \$25,412 each on an order of 25, and \$14,150 each for 200. Chester Vaughn Aircraft Division of United Aircraft Manufacturing Corp. bid \$30,470 for 25, and \$14,051 for 200. Peter J. Seersky Aircraft Engineering Corp. bid \$24,960, with a bid of \$15,800 for 200. Highest was Connelkhead Aircraft Corp. with a \$44,000 bid on a lot of 25, and \$24,260 for 200.

Awards will be made after evaluation by a procurement board considering price, performance, and ease of maintenance.

Financial

Year-end statements of Aero Supply, Arlington Corp., Fairbairn, National Aviation shows \$250,000 profit for first quarter of 1976.

Aero Supply Manufacturing Co. reported a profit of \$30,670 or \$1.46 a share, for 1975.

The Aviation Corp. lost \$412,422 last year, compared with a loss of \$33,599 in 1974.

Barfield Aviation Corp. showed a \$68,666 loss, after depreciation, interest, income taxes, and other deductions, compared with a \$60,000 loss in 1974.

First quarter profits for Mutual Aviation for 1976 amount to \$315,296. Another first-quarter review to report was Geo-Craft O Aircraft and Tool Corp., which earned \$2,721.

Canadian Transport

Air service in the Dominion carried more than three billion passenger miles of mail in 1975.

Passengers received recently from Canada show an impressive total for air operations in the Dominion during 1975. Exports and freight shipments amounted to 26,455,228 lb., and to \$274,341,000 worth of cargo. Canada's largest air transport company, Canadian Airways, carried 31,682 passengers and 5,298,776 lb. of freight.

More than 50 per cent of exports and freight operations during the year were in regions west of the Great Lakes.

Almost two-thirds of the exports and freight was carried by its companies, operating 300 planes, and employing 133 pilots and 352 air engineers. One operator, doing all his own piloting and using a single plane, transported \$20,045 lb. of freight.

Most of the freight operations served the mining districts of Quebec, western Ontario, eastern and northern Manitoba, northern Alberta and British Columbia, in many cases taking supplies to areas so inaccessible they had to be dropped.

New Volumes

DESIGN AIRCRAFT ELEMENTS BY PAUL H. PROBERT, published by Paul H. Probert, 196 Jay St. Brooklyn, N. Y., 127 pages, \$1.50.

A CONCISE and up-to-date review of the latest developments in design aspects and their component for strength, stiffness, and stress considerations for all known aviation fixed designs on the ground and abroad. Well priced, copiously illustrated, adequately indexed.

THE AIRCRAFT YEARBOOK FOR 1976, edited by Howard Hager, Jr., the Aeronautical Chamber of Commerce of America, Inc., New York, 536 pages, \$1.50.

FOR the enlightening, comprehensive view of the current of aviation in America is set down in the Chamber's Yearbook. Four compilations of the facts of any industry compare in accuracy and in completeness with this annual handbook. With statistics and well edited, it is a "must" for any aeronautical library.

ENGINEERING AIRCRAFT (Oversize Edition), edited by C. G. Draper, Pitman Publishing Corporation, New York, 642 pages, \$2.

ALTHOUGH written entirely from the British point of view, the Engineering aircraft makes an excellent survey of the general modern. The book offers, however, by being spread too thin. It attempts to be a complete history, a glossary of terms, and a handbook of technical information covering everything from war tanks to aerobics. As a history of aerobics it tells that of British's big, sedentary job of those years ago. As a

glossary it can scarcely compare with Robinson's "Technical Words-Book." It is copiously illustrated but most of the pictures are small and of three through medium reproduction.

ELEMENTS OF DATA ENGINEERING by Gerald Adams. The Norman W. Mundy Publishing Company, New York, 498 pages, \$4.

COVERING much broader territory than M. Williams' book, named elements on this page is Adams' treatise on civil engineering. It is intended for general classrooms and home study use on fixed problems in general and covers the whole field of engineering practice including structures, marine, locomotive and automotive types. For student use, each chapter is supplemented with a comprehensive set of questions and answers covering the topics studied.

INTERNATIONAL ORGANIZATION IN EUROPEAN AIR TRANSPORT, by Lawrence C. Tandy, Columbia University Press, New York, 229 pages, \$1.

THIS volume, as a member of the League of Nations Secretariat, has represented the League at various conferences during the past five years, but had unusual opportunities to study aviation affairs in Europe. He knows the role of air transport in Europe and the complicated international legal systems that have developed and coordinate international cooperation in European air transport is still far from complete, but is a worthy. He looks upon it as a study in the preservation of international peace.

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THAT'S a very comforting feeling when you're whizzing through the air at terrific speeds... day or night... so feel that "everything's under control". That's why so many aircraft manufacturers, pilots and mechanics trust upon American Steel & Wire Company Airplane Strand and Cables.

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cable because of its flexibility, also because of its extremely high strength in a small diameter cable.

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Schools, Services, and Airports

•**ALABAMA**—A series of Sunday afternoon air shows at Birmingham Municipal Airport, with Glenn Meyer giving a super-view show, were put on in March by Gold Garrison, Harry King and Glenn Meyer under the direction of Sandhu Asker, airport manager. John Crawford is using his new Taylor "Cub" for student instruction at Hartsfield.

•**ARKANSAS**—Three contractors have submitted bids for construction of a hangar and administration building at Little Rock Municipal Airport. The bids will be tabulated and allowed to the WPA, which has allotted \$60,000 for the project. . . . Fort Smith is considering acquisition of an airport site by floating a bond issue. The WPA has set aside \$2,000 for its development pending the city's request.

•**CALIFORNIA**—Joe Plesner of Grand Central Flying School, Glendale, has sold a Kinner Triplane and negotiated sale of a Pashland 24. . . . Fifty licensed pilots who fly for fun have organized the Aviation Country Club of California Inc., at Grand Central Air Terminal, Glendale. Officers: Ivan McGowan, president; Jerry Fowler, vice-president; Bert Stone, secretary, and Wally Tynes treasurer. . . . Clayton Smith is planning a three or four-day aerial tour which will start from Fresno-Clovis Airport, Fresno, and will take in Berkeley Dam, Sacramento City and Reno. Ten ships are expected to participate. Work has been started on the \$200,000 air base on Trinidad Island in Los Angeles Harbor. The airport will be named James Field in honor of Admiral Joseph Mason Jones. The WPA will spend \$440,000 and the city of Los Angeles will contribute another \$90,000.

•**FLORIDA**—The WPA is seeking \$200,000 in bonds at Deland, Joseph Mason Jones. The WPA will spend \$440,000 and the city of Los Angeles will contribute another \$90,000.

•**GEORGIA**—The Atlanta City Council has approved the lease of a 100,000 ft. tract of land at Atlanta Municipal Airport to E. G. Mason, who plans to erect hangars there. According to the lease, all buildings must be fireproof and of a permanent nature and will revert to the city at the expiration of the lease. Rental for the twenty-year period is \$2,500. . . . A series of twenty Taylor "Cubs" is scheduled to leave Atlanta early in May on a tour that will cover four Southern States. The pilots will compete for an efficiency trophy posted by the Taylor Aircraft Company. The itinerary includes Savannah, Orlando, Pensacola, Jacksonville, Tallahassee and Jacksonville.

•**IDAHO**—Plans for a hangar and Fafnir's shop is to be constructed at the University of Idaho, northern branch, Pocatello, have been submitted to the WPA. If the plans are approved a two-story building to cost approximately \$80,000 will be constructed.

•**ILLINOIS**—The Snyder Aircraft Company has reacquired and has taken longer quarters at Channahon Municipal Airport. The company, under the direction of Ray Snyder is endeavoring to equip its fleet of Gliders "Glider" aircraft trainers and also conduct an instrument rating and repair shop. . . . Prof. V. E. Eide, manager of DuSable County Airport, Waterman, announced that plans are being drawn up for construction of a new, and modern hangar to replace the one in which five planes were destroyed by fire recently. . . . LeRoy Mauley, who has operated an engine and airframe overhaul shop at Mount Hawley Airport, Penna., has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

•**KANSAS**—At a meeting of the Wichita Aviation Club early in April,

has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

•**MISSOURI**—The Aircraft Trades Association, Indianapolis, is sponsoring the eighth annual Indian Air Tour June 22-28. The tour will start approximately a score of pilots with the starting and finishing point at the Indianapolis Municipal Airport. Indians have been invited (one year to be placed). The St. Joseph County Board of Commissioners has taken an option to buy the Benke Municipal Airport, South Elkhart. . . . The \$100,000 project, a take-up the field will be eligible for \$400,000 of WPA funds for improvements. . . . Two experimental airways to cost approximately \$125,000 will be built at Purdue University Airport, Lafayette, this summer. Known different kinds of material will go into the runway in order to test their suitability. The Columbus Flying Service, Inc., has announced that Dwight W. Lashley will be their new chief instructor. He will fly the company's new C-3 Aerobat. He has a record of 32 solo students without accident.

•**NEW YORK**—The Syracuse Airport opened late in March, when the Spencer Chapter of Commerce took over as lease from the city. The chapter will give \$200 a year toward and will not make another 100 a year for improvements and repairs. Ed Cleveland, manager of the field, had five planes at the opening.

•**OHIO**—The State Aviation Commission has estimated that flood damage at Wyandot Field, Harrison, amounted to \$100,000. . . . Hiram

has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

•**OKLAHOMA**—The Snyder Aircraft Company has reacquired and has taken longer quarters at Channahon Municipal Airport. The company, under the direction of Ray Snyder is endeavoring to equip its fleet of Gliders "Glider" aircraft trainers and also conduct an instrument rating and repair shop. . . . Prof. V. E. Eide, manager of DuSable County Airport, Waterman, announced that plans are being drawn up for construction of a new, and modern hangar to replace the one in which five planes were destroyed by fire recently. . . . LeRoy Mauley, who has operated an engine and airframe overhaul shop at Mount Hawley Airport, Penna., has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

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•**PENNSYLVANIA**—The Snyder Aircraft Company has reacquired and has taken longer quarters at Channahon Municipal Airport. The company, under the direction of Ray Snyder is endeavoring to equip its fleet of Gliders "Glider" aircraft trainers and also conduct an instrument rating and repair shop. . . . Prof. V. E. Eide, manager of DuSable County Airport, Waterman, announced that plans are being drawn up for construction of a new, and modern hangar to replace the one in which five planes were destroyed by fire recently. . . . LeRoy Mauley, who has operated an engine and airframe overhaul shop at Mount Hawley Airport, Penna., has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

•**RHODE ISLAND**—The Snyder Aircraft Company has reacquired and has taken longer quarters at Channahon Municipal Airport. The company, under the direction of Ray Snyder is endeavoring to equip its fleet of Gliders "Glider" aircraft trainers and also conduct an instrument rating and repair shop. . . . Prof. V. E. Eide, manager of DuSable County Airport, Waterman, announced that plans are being drawn up for construction of a new, and modern hangar to replace the one in which five planes were destroyed by fire recently. . . . LeRoy Mauley, who has operated an engine and airframe overhaul shop at Mount Hawley Airport, Penna., has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

•**TENNESSEE**—The Snyder Aircraft Company has reacquired and has taken longer quarters at Channahon Municipal Airport. The company, under the direction of Ray Snyder is endeavoring to equip its fleet of Gliders "Glider" aircraft trainers and also conduct an instrument rating and repair shop. . . . Prof. V. E. Eide, manager of DuSable County Airport, Waterman, announced that plans are being drawn up for construction of a new, and modern hangar to replace the one in which five planes were destroyed by fire recently. . . . LeRoy Mauley, who has operated an engine and airframe overhaul shop at Mount Hawley Airport, Penna., has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

•**TEXAS**—The Snyder Aircraft Company has reacquired and has taken longer quarters at Channahon Municipal Airport. The company, under the direction of Ray Snyder is endeavoring to equip its fleet of Gliders "Glider" aircraft trainers and also conduct an instrument rating and repair shop. . . . Prof. V. E. Eide, manager of DuSable County Airport, Waterman, announced that plans are being drawn up for construction of a new, and modern hangar to replace the one in which five planes were destroyed by fire recently. . . . LeRoy Mauley, who has operated an engine and airframe overhaul shop at Mount Hawley Airport, Penna., has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

•**UTAH**—The Snyder Aircraft Company has reacquired and has taken longer quarters at Channahon Municipal Airport. The company, under the direction of Ray Snyder is endeavoring to equip its fleet of Gliders "Glider" aircraft trainers and also conduct an instrument rating and repair shop. . . . Prof. V. E. Eide, manager of DuSable County Airport, Waterman, announced that plans are being drawn up for construction of a new, and modern hangar to replace the one in which five planes were destroyed by fire recently. . . . LeRoy Mauley, who has operated an engine and airframe overhaul shop at Mount Hawley Airport, Penna., has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

•**VIRGINIA**—The Snyder Aircraft Company has reacquired and has taken longer quarters at Channahon Municipal Airport. The company, under the direction of Ray Snyder is endeavoring to equip its fleet of Gliders "Glider" aircraft trainers and also conduct an instrument rating and repair shop. . . . Prof. V. E. Eide, manager of DuSable County Airport, Waterman, announced that plans are being drawn up for construction of a new, and modern hangar to replace the one in which five planes were destroyed by fire recently. . . . LeRoy Mauley, who has operated an engine and airframe overhaul shop at Mount Hawley Airport, Penna., has moved his equipment to Shippensburg Municipal Airport. He has installed welding and woodworking equipment. . . . With improvement in the weather, the preliminary work at Mount Municipal Airport \$400,000 WPA improvement project has been resumed with about 2,000 sq. ft. of dirt being removed daily. Before the project can be completed \$80,000 said, must be moved. . . . Kenneth Kugel is now site manager of Mount Hawley Airport. . . . There are five planes hangared at the field, two of these belonging to Kugel. . . . T. G. Wells has been re-elected president of the Decatur Airport society. . . . The AA Flying Club has been invited at Cortland-Stenberg Airport, Earl St. Lucia, under the direction of E. L. Nash and J. A. Reilly. . . . There are 435 Flying clubs on \$7.50 an hour in the Carlini Flying and \$5 per hour in the Taylor "Cub" either dual or solo.

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members direct a talk by Albert Mac Donald, director of Parks and Airports for the city. He discussed the future of Wichita Airport, speaking principally of the improvement work.

• **KENTUCKY**—The Lexington Board of City Commissioners has voted to lease Lexington Municipal Airport for \$1 a year to the Lexington Air Taxi Service. The company will pay all operating expenses and the city will pay the normal rental on the land. . . . The Bureau of Air Commerce has recommended a recent comprehensive plan of improvement at Molineux Airport. The WPA has already allocated \$20,000 for the work and the city commission is asking for another \$20,000. This one plant will add to an 80,000 ft. fireproof hangar and some changes in runways, including a change in direction of the north-south runway and a 6,000 ft. runway for the east-west runway. Plans and telephone lines will be placed underground. . . . Work was scheduled to get under way late in March to double the capacity of the administration building at Brenner Field, Louisville, at a \$5,000 WPA project. . . . Bureau of Air Commerce has approved a \$27,500 air meeting program for Kentucky Calk Aero Service, Inc., has been located at Brenner Field, Louisville, for student instruction and charter work. Flight training will be in an Astrojet, for which the company is state dealer. Officers: Frank S. Cook, president; J. Tyler Thomas, vice-president.

• **LOUISIANA**—Eight plans of the New Orleans Aviation Club, carrying various machinery, made a trip from New Orleans to Greenville late in March. . . . The Bureau of Air Commerce has approved expenditure of \$26,618 for construction of an airport at Camp Boissacquet. . . . \$15,000 has been allocated by the WPA for land rearing work at Shenandoah Airport, New Orleans.

• **MAINE**—The Town of Somers will purchase Dr. Grant Airport and complete the work of drainage and grading started some time ago. There is room at the field for a mile-long runway, and the town will ask WPA assistance for the improvement work. . . . The Bucks County Civil Guard has voted to spend up to \$50,000 for building runway at Goshen Field. This may include the city eligible for \$25,000 from the WPA.

• **MARYLAND**—The PWA has announced the approval of a \$1,000,000 grant for completion of the municipal airport at Baltimore. To date the city will add \$200,000. Of the total about \$1,000,000 will be spent to complete the field and the remaining \$200,000 will go for runways and buildings. Completion of the airport will provide 300 acres of

landing field and a complete operation area ranging in length from 6,000 to 20,000 ft. A sum of \$3,500,000 has already been spent in building hangar and other buildings.

• **MASSACHUSETTS**—The Seaplane Base Air Service has moved to Goshen Airport, North Andover. These ships are a Stearns Cub, a Taylor "Cub" and a Great Lakes biplane. All will be used for skid landing and student instruction. Walter Hancock will conduct a one-day school. . . . Boston has leased Governor's Island from the War Department for fifteen years, and the island's 72 acres will be added to East Boston Airport, allowing extension of present runways.

• **MICHIGAN**—The State Department of Aeronautics is sponsoring a Michigan airport conference to be held at Traverse City on May 28 and 29. Airport improvement projects in 35 cities have been approved by the WPA and are under construction or will be soon. Of the 30 airport projects either approved or pending approval, seventeen call for construction of new landing fields, eighteen for construction of new hangars and seven for construction of hard surfaced runways and taxi strips. . . . Wayne County Airport, Detroit, has been selected as the scene of the Second National International Flying and Gliding Meet, June 19-20.

The Bureau of Air Commerce is planning to air show late May 19. The city commission has agreed to furnish equipment and men to get the field in shape by mowing and rolling runways. . . . Ben Sherrill, Inc., has delivered two new Taylor "Cubs" to the Detroit City Airport and one to Eddy McHenry, who will take it to Tusculum Airport.

• **MISSISSIPPI**—An air show featuring the Flying Boat was scheduled for early April at Hattiesburg Municipal Airport. The show was sponsored by the American Legion.

• **MISSOURI**—The WPA has approved expenditure of \$20,370 for airport improvements at Missouri. The work is as follows: St. Joseph, \$95,967; Joplin, \$11,294; Portland, \$10,984; St. Louis, \$4,364; Moberly, \$5,352; Columbia, \$1,500. . . . W. K. Kutz, president of St. Louis Flying Service, Inc., Lambert-St. Louis Municipal Airport, reports the sale of fifteen planes in the first three months of 1980. Gross returns were approximately double the same period in 1979.

• **NEBRASKA**—Improvements at Grand Island Municipal Airport will include a new administration building, hangar, a 200x500 ft. service apron and

an asphalt runway 350 ft. wide and 1400 ft. long. The work is a WPA project. . . . A \$300,000 WPA improvement will provide concrete runways, an administration building, additional hangars and an extension of the lighting system at Pierre Platte Municipal Airport. . . . To succeed Claude J. Campbell, the State Aeronautics Commission has elected Dr. W. H. Armstrong as chairman. The commission has recently bought a Piper monoplaner which will be used for state purposes and for the civil jobs of the commission. Its pilot will be Claude Doyle, secretary of the commission.

• **NEVADA**—Reno is seeking \$400,000 from the WPA for improvements at the municipal airport. Under the plan Washoe County will spend \$10,000 to acquire additional land near the present field. United Air Lines will spend \$7,000 for the same purpose.

• **NEW JERSEY**—The Senate has named the members of its Richard Albright, manager of Newark Airport, as a member of the state aviation commission. . . . The Flying Club of America, under the direction of Claude G. Demerill, has announced the start of the 1980 flying season at Princeton Airport.

• **NEW MEXICO**—Aeronautics is planning a new municipal airport 5 miles south of the University at New Mexico. This call for two 5,000 ft. runways, taxiways and machine shops. . . . A spot landing contest at Albuquerque Airport, early in April, first prize went to Virgil Isaac, second, William Piper; third, Paul Spencer.

• **NEW YORK**—Lawrence is considering construction of a hangar on the Department of Commerce lot on Middle Road. The work would be done by the WPA. . . . The Town Council of Myers Plains will receive reimbursement of an airport at Valhalla of land adjacent to the project is subdividing. A petition bearing several hundred signatures of Valhalla residents has been presented to the Council urging authorization to construct the field. The State WPA is studying authorization by the Council for allocation of funds. . . . Of the \$306,534 allocated by the WPA for improvement work at Buffalo Airport, \$25,000 is still unspent. Because of the lack of qualified WPA labor in Salamanca County, the Board of Supervisors gives no assistance but the county airport project will be completed this year.

• **NEVADA**—Reno is seeking authorization of an action between Demerill and W. H. Armstrong. . . . WPA has granted \$60,000 for construction of an airport at Oakesdale. It will be used to start excavation and grading. Another \$50-



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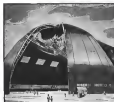
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2,100,180, 2,100,181, 2,100,182, 2,100,183, 2,100,184, 2,100,185, 2,100,186, 2,100,187, 2,100,188, 2,100,189, 2,100,190, 2,100,191, 2,100,192, 2,100,193, 2,100,194, 2,100,195, 2,100,196, 2,100,197, 2,100,198, 2,100,199, 2,100,200, 2,100,201, 2,100,202, 2,100,203, 2,100,204, 2,100,205, 2,100,206, 2,100,207, 2,100,208, 2,100,209, 2,100,210, 2,100,211, 2,100,212, 2,100,213, 2,100,214, 2,100,215, 2,100,216, 2,100,217, 2,100,218, 2,100,219, 2,100,220, 2,100,221, 2,100,222, 2,100,223, 2,100,224, 2,100,225, 2,100,226, 2,100,227, 2,100,228, 2,100,229, 2,100,230, 2,100,231, 2,100,232, 2,100,233, 2,100,234, 2,100,235, 2,100,236, 2,100,237, 2,100,238, 2,100,239, 2,100,240, 2,100,241, 2,100,242, 2,100,243, 2,100,244, 2,100,245, 2,100,246, 2,100,247, 2,100,248, 2,100,249, 2,100,250, 2,100,251, 2,100,252, 2,100,253, 2,100,254, 2,100,255, 2,100,256, 2,100,257, 2,100,258, 2,100,259, 2,100,260, 2,100,261, 2,100,262, 2,100,263, 2,100,264, 2,100,265, 2,100,266, 2,100,267, 2,100,268, 2,100,269, 2,100,270, 2,100,271, 2,100,272, 2,100,273, 2,100,274, 2,100,275, 2,100,276, 2,100,277, 2,100,278, 2,100,279, 2,100,280, 2,100,281, 2,100,282, 2,100,283, 2,100,284, 2,100,285, 2,100,286, 2,100,287, 2,100,288, 2,100,289, 2,100,290, 2,100,291, 2,100,292, 2,100,293, 2,100,294, 2,100,295, 2,100,296, 2,100,297, 2,100,298, 2,100,299, 2,100,300, 2,100,301, 2,100,302, 2,100,303, 2,100,304, 2,100,305, 2,100,306, 2,100,307, 2,100,308, 2,100,309, 2,100,310, 2,100,311, 2,100,312, 2,100,313, 2,100,314, 2,100,315, 2,100,316, 2,100,317, 2,100,318, 2,100,319, 2,100,320, 2,100,321, 2,100,322, 2,100,323, 2,100,324, 2,100,325, 2,100,326, 2,100,327, 2,100,328, 2,100,329, 2,100,330, 2,100,331, 2,100,332, 2,100,333, 2,100,334, 2,100,335, 2,100,336, 2,100,337, 2,100,338, 2,100,339, 2,100,340, 2,100,341, 2,100,342, 2,100,343, 2,100,344, 2,100,345, 2,100,346, 2,100,347, 2,100,348, 2,100,349, 2,100,350, 2,100,351, 2,100,352, 2,100,353, 2,100,354, 2,100,355, 2,100,356, 2,100,357, 2,100,358, 2,100,359, 2,100,360, 2,100,361, 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2,100,635, 2,100,636, 2,100,637, 2,100,638, 2,100,639, 2,100,640, 2,100,641, 2,100,642, 2,100,643, 2,100,644, 2,100,645, 2,100,646, 2,100,647, 2,100,648, 2,100,649, 2,100,650, 2,100,651, 2,100,652, 2,100,653, 2,100,654, 2,100,655, 2,100,656, 2,100,657, 2,100,658, 2,100,659, 2,100,660, 2,100,661, 2,100,662, 2,100,663, 2,100,664, 2,100,665, 2,100,666, 2,100,667, 2,100,668, 2,100,669, 2,100,670, 2,100,671, 2,100,672, 2,100,673, 2,100,674, 2,100,675, 2,100,676, 2,100,677, 2,100,678, 2,100,679, 2,100,680, 2,100,681, 2,100,682, 2,100,683, 2,100,684, 2,100,685, 2,100,686, 2,100,687, 2,100,688, 2,100,689, 2,100,690, 2,100,691, 2,100,692, 2,100,693, 2,100,694, 2,100,695, 2,100,696, 2,100,697, 2,100,698, 2,100,699, 2,100,700, 2,100,701, 2,100,702, 2,100,703, 2,100,704, 2,100,705, 2,100,706, 2,100,707, 2,100,708, 2,100,709, 2,100,710, 2,100,711, 2,100,712, 2,100,713, 2,100,714, 2,100,715, 2,100,716, 2,100,717, 2,100,718, 2,100,719, 2,100,720, 2,100,721, 2,100,722, 2,100,723, 2,100,724, 2,100,725, 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2,100,999, 2,100,1000, 2,100,1001, 2,100,1002, 2,100,1003, 2,100,1004, 2,100,1005, 2,100,1006, 2,100,1007, 2,100,1008, 2,100,1009, 2,100,1010, 2,100,1011, 2,100,1012, 2,100,1013, 2,100,1014, 2,100,1015, 2,100,1016, 2,100,1017, 2,100,1018, 2,100,1019, 2,100,1020, 2,100,1021, 2,100,1022, 2,100,1023, 2,100,1024, 2,100,1025, 2,100,1026, 2,100,1027, 2,100,1028, 2,100,1029, 2,100,1030, 2,100,1031, 2,100,1032, 2,100,1033, 2,100,1034, 2,100,1035, 2,100,1036, 2,100,1037, 2,1

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W. French Aviation Corporation as reason that Rexnord also was to be provided with its newly organized subsidiary, Perichord Aviation, Inc. (Dana Securities). Mr. Robinson has been active in the management of the various Perichord companies since the formation of the company corporation in 1958, of which he became president in 1958. He has had wide experience in sales and development work in Canada, the Orient, the Near East and Europe. C. A. Harrop, who has been sales manager of Perichord Aircraft Canada Company has been named vice-president of the new subsidiary.

• The National Automobile Association has named CHARLES E. LAWRENCE chairman of the committee to select the recipient of the 1935 Coffey Trophy presented annually since 1911. According to Mr. Lawrence is a board of award are FOWLER CARROLL, JR., CHAIRMAN; J. C. HILGEMAN, CHL. ERIC S. GOSWELL, L. W. GARDY, FRED L. SMITH, and MAJOR ALFRED J. WINDHAM. Mr. Lawrence, pioneer sports designer and himself a winner of the Coffey Trophy is also one of the administrators of the Sylvester Abbott Road Award.

*The members of the Metropolitan Section of the S.A.E. assembled at a traditional dinner and dance in New York City on May 1, in tribute to Capt. Edward V. Ruckelshaus. The Society plans to honor one of its outstanding members each year, and began with Capt. Ruckelshaus in recognition of his record as a War hero and as a leader in aeronautics. He is vice-president of North American Aviation, Inc. and since January, 1953, has been general manager of Eastern Air Lines.

• The appointment of Lawrence D. Seymour, to vice-president and general manager of the Pitman Aerospace Company was announced today by Harold F. Pitman, president. Mr. Seymour was formerly president of American Airlines, Inc., and had been vice-president and general manager of National Air Transport Inc. during the period when that organization developed the air mail line between New York, Chicago, and Dallas, Texas. He was later vice-president of United Airlines after the consolidation of Boeing Air Transport, National Air Transport



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Flowmeter Indicating Unit



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